

In the Claims

1 1. (Previously Presented) A method of cooling a low Z target material of a neutron source
2 assembly, comprising:
3 providing, by using a nozzle submerged in liquid gallium, a submerged jet of
4 concentrated liquid gallium in a direction normal to a non-bombarded surface of the low Z target
5 material within the neutron source assembly to cool the low Z target material;
6 providing a reservoir of liquid gallium; and
7 pumping the liquid gallium, serially, from the reservoir, through the nozzle, such that the
8 liquid gallium impinges upon the low Z target material in the neutron source assembly and cools
9 the target material, from the neutron source assembly directly to a heat exchanger to remove heat
10 from the liquid gallium, and from the heat exchanger to the reservoir.

1 **Claims 2-3 (Cancelled)**

1 4. (Previously Presented) The method of claim 1, wherein the target material comprises
2 beryllium.

1 5. (Previously Presented) A neutron source assembly having a liquid cooled target,
2 comprising:
3 an accelerator based neutron source including a low Z target material that is bombarded
4 by accelerated particles to produce a neutron flux; and
5 a cooling system to circulate liquid gallium through said accelerator based neutron source
6 to cool the low Z target material;
7 said cooling system including a nozzle, said nozzle being submerged in liquid gallium,
8 providing a submerged jet of concentrated liquid gallium in a direction normal to a non-
9 bombarded surface of the low Z target material within the accelerator based neutron source;
10 said cooling system further including,
11 a reservoir of liquid gallium;
12 a heat exchanger, and

means for serially circulating said liquid gallium from said reservoir through said nozzle to impinge upon said surface of the low Z target material within said accelerator based neutron source, from said accelerator based neutron source directly to said heat exchanger, and from said heat exchanger to said reservoir.

Claim 6 (Cancelled)

7. (Previously Presented) The neutron source assembly of claim 5, wherein said means for circulating comprises a pump.

8. (Previously Presented) A liquid cooling system for a neutron source assembly, said cooling system comprising:

a reservoir of liquid gallium;

a heat exchanger;

a nozzle, said nozzle being submerged in liquid gallium, providing a submerged jet of concentrated liquid gallium in a direction normal to a non-bombarded surface of a low Z target material within the neutron source assembly; and

means for serially circulating said liquid gallium from said reservoir through said nozzle to impinge upon said surface of the low Z target material within the neutron source assembly, from the neutron source assembly directly to said heat exchanger, and from said heat exchanger to said reservoir.